Space Weather Technical Forecast

Issued on Monday, 08 April 2024 at 01:10 Local

This technical forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

Space Weather Forecast Headline: No significant activity expected.

Analysis of Space Weather Activity over past 24 hours.

Solar Activity: Low with only two C-flares observed, peaking C1.1 at 07/1941 UTC from AR3632 in the northeast. There are seven sunspot regions on the visible disc, the largest is AR3628, a stable region nearing the northeast centre disc. The other regions remain small and stable.

A couple of far-side or limb CMEs have been observed, however there were no Earth-directed CMEs. A filament eruption on the northeast disc at 07/2230 UTC may have produced a CME, however imagery is currently unavailable to assess this.

Solar Wind / Geomagnetic Activity: The solar wind continued to ease to background slow wind conditions. Observed speeds by DSCOVR at L1 erratically declined from near 450km/s to just below 400km/s. The density was near to below average. Total Interplanetary Magnetic Field (IMF) strength, Bt, was Weak, below 6nT. The north-south component, Bz, was Weak and variable between +5 and -5nT. Phi angle was mainly negative (towards the Sun). Geomagnetic activity was Quiet (Kp 1-2).

Energetic Particles / Solar Radiation: High energy proton flux (greater than 10MeV) observed at GOES-18 was at background. High energy electron flux (greater than 2MeV) observed at GOES-16 was Background to Moderate, peaking 424 pfu at 06/1515 UTC. The associated 24-hour fluence remained well below the Active (1e8 integrated flux) threshold, with a value of 1.11e7 integrated pfu at 08/0000UTC.

Four-Day Space Weather Forecast Summary

Solar Activity: Low activity is likely through the period, with a slight chance of rising to Moderate with isolated M-class flares. This risk likely increasing a little through the period.

Solar Wind / Geomagnetic Activity: There are no Earth-directed CMEs. Current background winds are likely to become enhanced later day 1 and into day 2 (08-09 Apr) due to the arrival of fast winds from small CH20/+. Solar winds are then likely to ease back towards background days 3-4 (10-11 Apr). Geomagnetic activity is forecast to be mainly Quiet with Unsettled intervals, but increasing to Unsettled with Active intervals with any fast wind enhancement.

Energetic Particles / Solar Radiation: High energy proton flux as observed by GOES-18, is expected to persist at background. High energy electron flux at GOES-16 is expected to continue at Background to Moderate day 1-2, but likely easing towards more persistent background day 2, after the fast wind arrival from CH20. The associated 24 hr electron fluence is expected to remain below Active.

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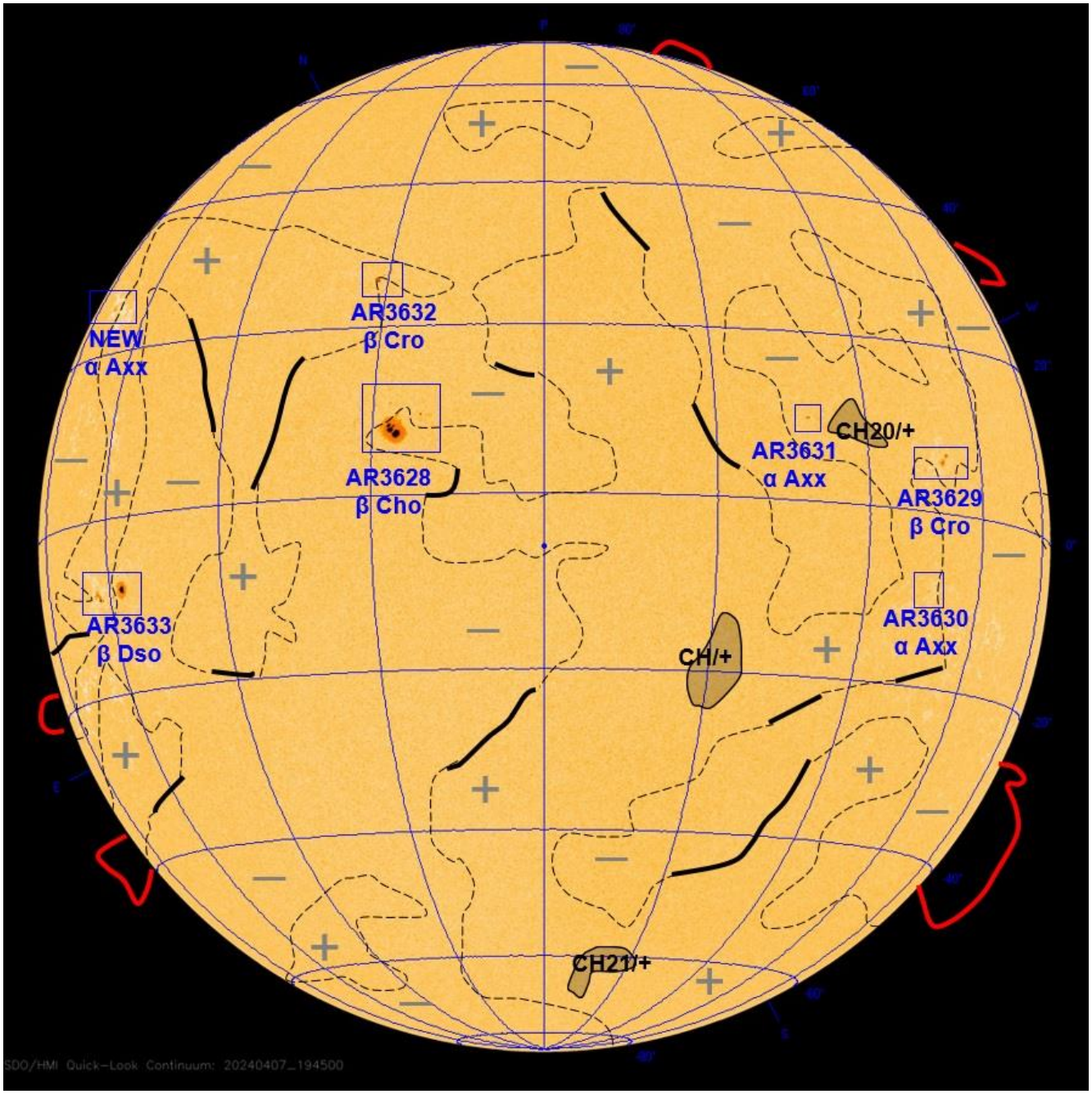
Figure 1. Solar Analysis Valid 07/2000 UTC.



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Key: Filament ___ , Prominence ___ , Magnetic Field Line - - - , Polarity +/-, Coronal Holes: Grey shaded area CHxx +/-, Sunspot groups 25xx - Mt Wilson α-β-βγ-βγδ and Zurich-McIntosh Axx etc.

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Geomagnetic Storms:

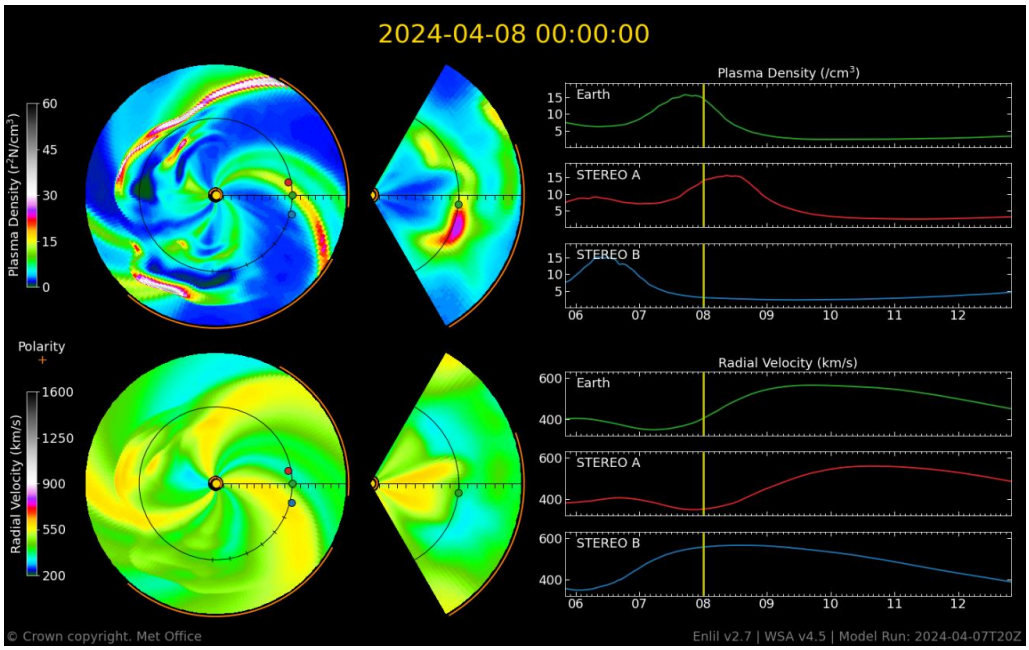
There are no Earth-directed CMEs.

Solar wind speeds are background to slightly elevated, at around 400 km/s. The next enhancement is forecast to be the arrival of the fast wind CH20/+. This most probably occurring later on day 1 (08 Apr), however the strength and timing of any connection is currently low confidence. Current MOSWOC Enlil expectations are considered likely overdone, with peak winds most likely around 450-500 km/s. Any associated fast wind will likely ease though days 3-4 (10-11 Apr), however there is also a low confidence unnumbered coronal hole in centre disc, which may lead to ongoing slightly elevated winds through the period.

Mainly Quiet geomagnetic activity is expected, with a slight chance of Unsettled intervals. However, a spell of Unsettled with Active intervals is expected with the onset of any coronal hole fast wind later day 1, perhaps continuing into day 2 (08-09 Apr).

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	5	5	1	1
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Figure 2: Enlil showing broad fast wind arrival, but currently considered over-estimated



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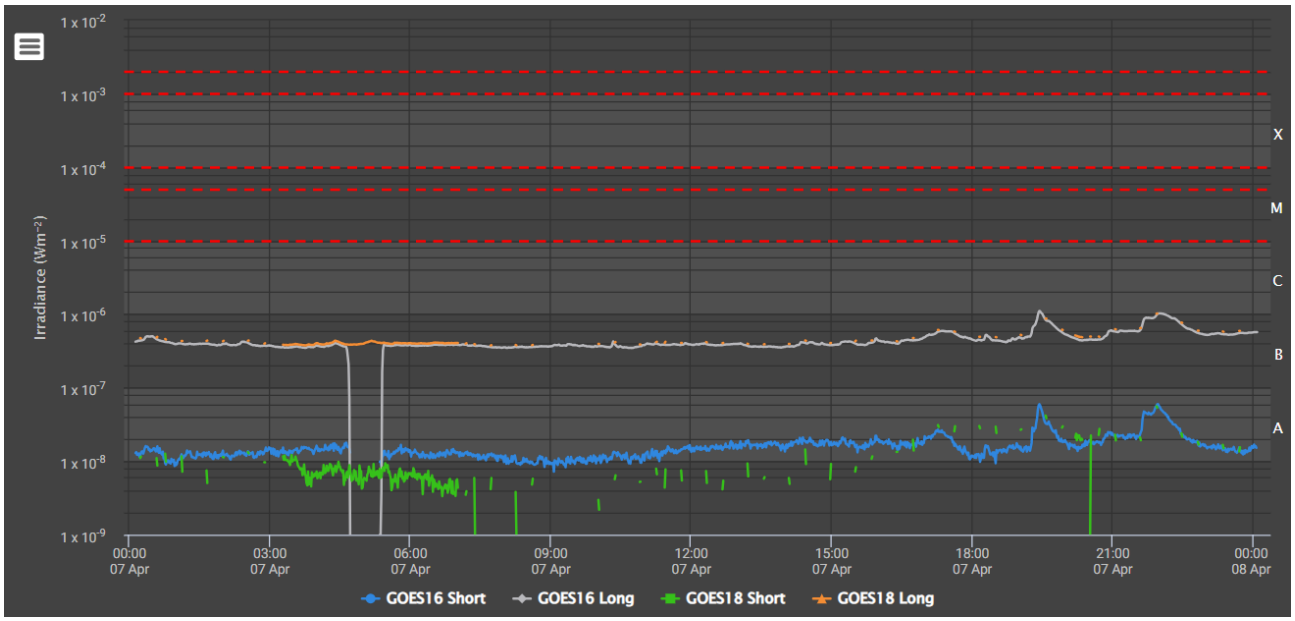
Radio Blackouts - X-Ray Flares:

Low activity is likely, with occasional C-flares, and just the slight chance of rising to Moderate with isolated M-flares.

There are seven sunspot regions on the disc, the largest of which is AR3628, a stable bipolar region just northeast of centre disc. Growth also been observed in the next largest region, AR3633, although this remains a simple bipolar region near the west limb. The other regions remain small and simple.

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	15	20	30	30
Very Active	R3 to R5 X Class	No	1	1	1	1

Figure 3: GOES 16/18 X-ray Flux



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Solar Radiation Storms - (High Energy Protons):

High energy proton flux as observed by GOES-18 is at background and expected to persist at this level with the currently visible active regions not expected to bring a risk of proton rich flares.

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	**≥ S1**	No	1	1	1	1
Very Active	**≥ S3 ***	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

High Energy Electrons Event (≥ 2MeV):

High energy electron flux observed by GOES-16 is likely to vary between Background and Moderate at first, before perhaps dropping to be more persistently Background day 2 (09 Apr) onward. This would be in response to the fast wind arrival from CH20. Only a minimal connection to this feature is expected however, with flux likely persisting at or near background thereafter.

The associated 24 hour electron fluence is expected to remain below the Active threshold, with REFM currently giving good guidance for expected conditions.

GEO Electron Environment Probability (Exceedance)	Level (cm^{-2} sr^{-1} day^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	**≥ 2 MeV ≥ $1x10^8$**	No	1	1	1	1
Very Active	**≥ 2 MeV ≥ $1x10^9$**	No	1	1	1	1

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